

A Forecast of Regional Atmospheric Electric Discharges for South America: A Case Study

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ABSTRACT: Incidences of atmospheric discharges are the cause of life and property losses, having a role in problems with power transmission lines, affecting their operation and potentially causing failures and interruptions. This work intends to examine the prognostic viability of the index of the Lightning Potential Index (LPI) and the value of the special overlay of Transmission Lines (buffer), which is a parameter for the development of the statistical analysis of atmospheric discharges in their premises and consequently for the estimation of failure risk. The processed data was used in the output of the ETA-20 regional model from the CPTEC/INPE. The case chosen for the test occurred at 00:00 UTC on September 24th, 2010, when the atmospheric discharges registered by the sensors reached the South and Southeast regions in Brazil. The diagnostic method consisted in determining the values of variables directly derived from the equations presented in Frisbie et al. [2009]. The calculations resulted in LPI and buffer values confronted with satellite GOES-E images and with the lightning registered and plotted. In analogy, prognostic test was made based on the initial condition of 12 UTC before, for a period of subsequent 12 hours, coinciding with the chosen event. The experiment resulted sufficiently satisfactory to affirm that it is possible to carry out short term forecasts (12 to 24 hours) of potential incidence of lightning over South America. The next step would be to carry out analogous tests for global models in use, based on this present case.

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